**Cold Can Challenge**

**Building a Better Koozie**

Essential Question:

How can we slow the process of thermal energy transfer that occurs through conduction, convection, and radiation?

LG #2 I can design and construct a device that slows heat transfer through radiation, conduction, and convection.

Your goal is to create a device that keeps liquid in a pop can at a cool temperature. The device needs to allow a person to drink the liquid and be able to replace the pop can. You may use any material you feel would be appropriate. Your pop can insulating device will be subjected to heat transfers in the form of conduction, convection, and radiation.

Your device must fit inside of a 10 cm x 10 cm x 14 cm box. If it does not fit, you will be disqualified and will not be allowed to test the device.

During the testing of your device, you will be taking temperature readings, recording data, and graphing your results.

Your final project will include:

* Design sketch – include explanation of how it will slow thermal energy transfers.
* Data chart and graph – correctly labeled and including units
* Explanation and drawing of how the thermal energy was transferred to the can
* Changes for the future to improve your design

**Cold Can Challenge Scale**

|  |  |  |  |
| --- | --- | --- | --- |
| **Objective** | **Right On**  **3** | **Almost There**  **2** | **Work to Do**  **1** |
| **Design Sketch** | Includes materials, plans, drawings, tells how each material is going to stop conduction, convection, and radiation. | Some aspects are missing, but overall explains design. | Several aspects of design are missing. |
| **Chart and Graph** | Labels for chart and graph (x and y), correct information, title, units included | Chart and graph missing one to two elements. | Chart and graph missing more than two elements. |
| **Thermal Energy Transfer** | All three heat transfer are accurately explained and drawn. | One heat transfer is not explained or drawn in detail. | Two heat transfers are not drawn or explained in detail. |
| **Improvements** | Detailed ideas for changes in the future. Changes accurately address heat transfers. | Changes for the future are not explained OR changes do not address heat transfers. | Changes are not explained in detail AND do not address heat transfers. |

Increased scale numbers are awarded when students go above and beyond the requirements of a level 3.

**Average Scale Score \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Design Sketch Blueprint**

Draw all layers and label how each will slow the transfer of thermal energy.

